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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,506	09/23/2005	Yizhou Song	P05,0328	9959
26574 7590 12/07/2009 SCHIEF HARDIN, LLP PATENT DEPARTMENT 233 S. Wacker Drive-Suite 6600 CHICAGO, IL 60606-6473				
EXAMINER				
BAND, MICHAEL A				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
12/07/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,506

Applicant(s)

SONG ET AL.

Examiner

MICHAEL BAND

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2009.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9, 10 and 15-28 is/are pending in the application.
4a) Of the above claim(s) 9, 10 and 22-28 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 15-21 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 15-16 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartsough (US Patent No. 4,420,385).

With respect to claims 15-16 and 18-19, Hartsough discloses a method for forming a thin film on a substrate [40] where a process chamber [24] has a sputter zone [62] and a chemical reaction zone [70] (abstract; figs. 1-2), where the sputtering is of a metal using an argon source [34] and the reaction zone [70] uses an oxygen source [31] (fig. 2; col. 2, lines 14-17). It is expected that some portion of the argon source [34] diffuses into the chemical reaction zone [70]. Hartsough further discloses sputtering the aluminum onto the substrate [40] in the sputtering zone [62], where said substrate [40] is then rotated into the reaction zone [70] so that the aluminum reacts with the oxygen to form a dielectric (i.e. compound) thin film of Al_2O_3 (col. 2, lines 29-36). Hartsough also discusses repeatedly exposing the substrate [40] to the sputtering zone [62] and reaction zone [70] until the dielectric Al_2O_3 film on said substrate [40] reaches a desired thickness (col. 4, lines 54-59). Fig. 5 depicts selectively controlling the speed of a substrate table (i.e. holder) [26] in regards to material where fig. 1 depicts said substrate

table [26] as cylindrical with the substrate [40] near an outer peripheral face. Hartsough also discloses depositing a layer having a thickness of 7.5 angstroms (col. 4, lines 48-54), with another deposited layer having a thickness of 11 angstroms (col. 6, lines 24-30). Since the layers are deposited to two distinct thicknesses, one of ordinary skill would find it obvious that the layers are deposited at distinct deposition rates to attain said distinct thicknesses. And since fig. 5 depicts the deposition rates being a function of rotational speeds of the substrate table [26] (col. 4, lines 17-22), adjustment of a deposition rate results in adjustment of the rotation speed of said substrate table [26]. Hartsough further discloses using a rotational speed of 60RPM being used, with higher rotational speeds, and thus adjustments, also being used (col. 6, lines 64-68; col. 7, lines 1-2). The optical characteristics being in a hysteresis region are inherent because all method limitations are met. If not, it must be due to claim limitations that are not present. Fig. 2 also depicts a flow controller [30] for the oxygen source [31], with Hartsough stating that oxygen partial pressure is set (i.e. increased or decreased) in regards to the rotational speed of the substrate table [26] (col. 6, lines 47-68). Since the oxygen partial pressure is either increased or decreased via flow controller [30] based upon the substrate table [26] speed, the increase or decrease of an oxygen flow rate is therefore based upon the speed of said substrate table [26] as well.

3. Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartsough (US Patent No. 4,420,385) as applied to claim 15, and further in view of Sproul et al (US Patent No. 5,789,071).

With respect to claims 18 and 21, the reference is cited as discussed for claim 15. However Hartsough is limited in that while a partial pressure of the reactive gas is specified, a specific flow rate is not suggested.

Sproul et al teaches multilayer oxide coatings, specifically of aluminum oxide (Al_2O_3) (col. 9, lines 42-49). Sproul et al further teaches the appropriate partial pressure of oxygen is selected from the hysteresis curve which relates to oxygen gas flow (col. 10, lines 54-57), with a Table on col. 11 depicting a partial oxygen pressure of 0.03 mTorr. Sproul et al also teaches that referring to fig. 5, when the optimal partial pressure of oxygen is in the range of 0.02 mTorr, the oxygen flow is constant in the range of 15 to 20 sccm (col. 8, lines 63-66).

It would have been obvious to one of ordinary skill in the art to use the oxygen flow rate of Sproul et al for the flow rate of Hartsough since Hartsough fails to specify a flow rate and one of ordinary skill would have a reasonable expectation of success in making the modification since Sproul et al has shown similar oxygen partial pressures as those of Hartsough in the sputtering of aluminum.

4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hartsough (US Patent No. 4,420,385) as applied to claim 15, and further in view of Matsumoto et al (US Patent No. 6,287,430).

With respect to claim 20, the reference is cited as discussed for claim 15. However Hartsough is limited in that while one target of Al is specified, having two targets capable of switching as anode and cathode is not suggested.

Matsumoto et al teaches a method of forming a thin film (abstract), where fig. 7 depicts a process chamber [10] comprising a sputtering zone having sputter targets [41a], [41b] with an argon source [44] and a chemical reaction zone with an oxygen source [35a], with fig. 6 depicting a substrate holder [20] rotating between said sputtering zone and said chemical reaction zone. Matsumoto et al further discloses the sputter targets [41a], [41b] comprise Al (col. 10, lines 58-65), where said sputter targets [41a], [41b] operate with one target [41a] being a cathode and a second target [41b] being an anode, with said sputter targets [41a], [41b] alternating between anode and cathode (col. 11, lines 24-40). Matsumoto et al cites the advantage of using two sputter targets alternating between cathode and anode as attaining a film with good reproducibility (col. 51-58).

It would have been obvious to one of ordinary skill in the art to incorporate two sputter targets taught by Matsumoto et al in place of the one sputter target of Hartsough to gain the advantage of attaining a film exhibiting good reproducibility.

Response to Arguments

102 Rejections

5. Applicant's arguments with respect to claims 15-16 and 18-19 have been considered but are moot in view of the new ground(s) of rejection due to the new limitation requiring adjusting the speed of the conveying while the target is sputtered in the sputtering zone and while the intermediate thin film is reacted with the reactive gas in the reactive zone.

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6. All other arguments are directed towards the subject matter above and have been addressed accordingly.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 9am-5pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Jennifer K. Michener/

Supervisory Patent Examiner, Art Unit 1795